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# INDOOR GARDEN

## for Decorative Plants



U.S. DEPARTMENT OF AGRICULTURE



# Indoor Garden for Decorative Plants

by Henry M. Cathey, Crops Research Division, Agricultural Research Service

You can grow and display many kinds of decorative plants in your home by using an indoor garden. An indoor garden essentially is a planter equipped with high-intensity fluorescent lights.

The idea is not new. For years, houseplant growers—African violet enthusiasts in particular—have worked to develop ways of growing plants satisfactorily where there is little or no daylight (see p. 7, More Information). By acclimating the plants to a dimly lighted environment and by providing supplementary lighting with fluorescent tubes, these growers have been able to maintain plants indoors for long periods. But they have been hampered by lack of a light source that is suitable for plant display—a source that is high in intensity, that is not too hot for the plants, and that does not detract from the appearance of the surroundings. With the development of high-output (HO) panel fluorescent lights and very high output (VHO) fluorescent tubes, many of their handicaps have been overcome.

When grown in an indoor garden illuminated by these HO and VHO fluorescent lights, plants thrive—plants that barely existed indoors before the lights were developed.

To grow plants satisfactorily in an indoor garden—

- Water the plants only often enough to prevent wilting—then water thoroughly.
- Fertilize the plants every 2 to 4 weeks while they are actively growing.
- Illuminate the plants with HO or VHO fluorescent lights 12 to 16 hours daily.

## THE GARDEN

Plans for three versions of the garden are shown. A cabinetmaker should be able to construct an indoor garden by following these general plans.

Plan A is for a garden with a planter box 2 feet square. This is a focal-point garden—used as the principal decorative accessory in a room.

Plan B is for a tall, narrow garden—6 feet tall and 1 foot square. It is designed for displaying plants in hanging baskets.

Plan C is for a garden 4 feet long and 1 foot deep. This long, narrow garden is most useful in a dimly lighted corridor. It will brighten as well as decorate the corridor. This version of the indoor garden also may be used as a room divider.

## Planter Box

The planter box can be made of fir plywood painted to match the walls in the room where it will be used, or it can be made of veneered plywood stained or oiled to match the furniture that it is to be displayed with. Many kinds of wood and wood finishes are available that are suitable for planters.

Inside the planter is a watertight liner. This liner is best made of sheet tin painted with asphalt to retard rusting. For a temporary liner, heavy-gage polyethylene may be stapled inside the planter.

The planter is mounted on a platform, equipped with casters, that fits under the riser. The garden may be moved easily; floors and carpets around it may be cleaned; plants in the garden may be reached easily for care and replacement; and the room's contents—garden as well as furniture—may be rearranged easily.

Waterproof hanging baskets are available for use with the tall, narrow garden shown in plan B. These baskets have a drainage disk in them; excess water can be drained from the baskets.

## Lighting System

The lighting system for the garden using panel fluorescent lights consists of separate lamps, ballast, fixture, and timer.

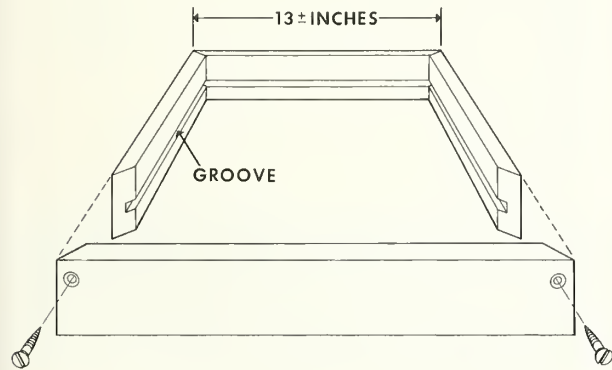
The panel fluorescent lamps are General Electric deluxe cool white (FP-12S/CW).<sup>1</sup> They also are available in tints other than cool white. They require special connectors [ALF 510 series], which should be ordered at the same time the lights are ordered.

Rapid start ballast 7G3720 is required for these lamps. One ballast will operate two panel fluorescent lamps.

When you order lamps, ask the dealer if fixtures are available for them. If not, you will have to make your own or have them made. The fixture consists of a wood frame about 13 inches square. Three of

<sup>1</sup> Trade names are used in the publication solely to provide specific information. Mention of a trade name does not constitute a guarantee of the product by the U.S. Department of Agriculture nor does it imply an endorsement by the Department over comparable products that are not named.

the sides of the frame have grooves cut in the inside faces. The panel fluorescent lamp is slid into these grooves and the fourth side of the frame then is screwed in place, holding the lamp secure in the frame.



**Fixture for panel fluorescent lamps. Frames must be custom fitted to each lamp.**

The lamps are held in position over the planter by slotted metal channels 4 feet long. These channels are wall standards for adjustable-bracket shelves. They are available at most large hardware stores. The lamps, in their wooden fixtures, rest waffle side toward the plants on 12-inch brackets that are set in the slots at the top of the standards. The upturned ends should be cut from the brackets to form a flat top on the brackets.

The ballast is separate from the light fixtures; it can be placed on the rear of the planter box where it is out of sight and where the heat that it generates will not harm the plants in the garden.

Also on the rear of the planter should be a timer—available for about \$10 at electrical-supply houses. This timer assures that the lighting system comes on and goes off at the proper time every day; no one need be present to attend the garden.

The timer, ballast, and lamps are connected as shown in the wiring diagram on page 8. Wires from the ballast to the lamps are covered with plastic tubing and are hidden in the hollow back of the standard that supports the lamps.

VHO fluorescent lamps [Sylvania VHO Powertube, 110 watts, F 48T12/CW/VHO] are available as complete lighting systems—tubes, fixture, reflector, and ballast. The fixture can be connected to the timer that is mounted on the rear of the planter. VHO fixtures can be used on the corridor model of the garden (Plan C).



**Focal-point garden using panel fluorescent lamps (Plan A). With lamps attached to the rear standards, as shown here, lighting intensity is high enough for good growth of flowering plants.**

## SELECTING A LOCATION

The best place to put an indoor garden is where the temperature during the day is about 75° and the temperature during the night is about 65°.

Avoid locations near heating ducts, exhaust fans, or doorways to the outside. Hot air from heating ducts heats and dries the plants. Cold air and drafts from exhaust fans and outside doors may chill the plants.

It's also a good idea to avoid areas of heavy traffic in the home. Not only is the planter often in the way where traffic is heavy, but plants in the garden are likely to be damaged by passing traffic.

Wherever it is used, an indoor garden will light the ceiling and walls as well as the plants. This extra light may be welcome; it may serve as the primary source of illumination for the room. But it may be

unwelcome—glare, rather than brightness. To reduce glare, put fiberglass diffusers on the back of the panel lamps. **DO NOT PUT DIFFUSERS BETWEEN THE LIGHTS AND THE PLANTS;** the plants need all the light they can get.

## STOCKING THE GARDEN

The degree of satisfaction that your garden brings you depends, more than anything else, on your selection of plants for it—plants that are both attractive and adaptable to growing indoors. Your skill in arranging the plants that you select can add to your enjoyment of the garden.

Plants should not be planted directly in the indoor garden, but should be potted and the pots set in the garden. This method of handling the plants allows you to rearrange your garden periodically. And you can use seasonal plants in your garden—poinsettia at Christmas, azalea or tulips at Valentine's day, lily at Easter, hydrangea for Mother's Day, potted annuals during summer, or potted chrysanthemums in fall. Your garden should never remain static; it will soon become unattractive.

### Selecting Plants

Select plants according to the amount of light you are prepared to supply.

In general—

- Foliage plants needs only be lighted from the top.
- Flowering plants must be lighted from the top and back of the indoor garden.

So if you want to use only the fixtures that are parallel to the planter and mounted over it, select foliage plants. If you are willing also to mount lighting fixtures on the standards so the lamps shine forward onto the plants, you may include some flowering plants in the garden.

Specifically, here are the minimum lighting requirements of selected plants when they are illuminated 12 to 16 hours daily.

#### Low light (50 foot candles)

Aglaanemo (Chinese evergreen)  
Aspidistra  
Dieffenbachia (Dumb cane)  
Dracaena  
Philadrendran axycardium

#### Medium light (500 foot candles)

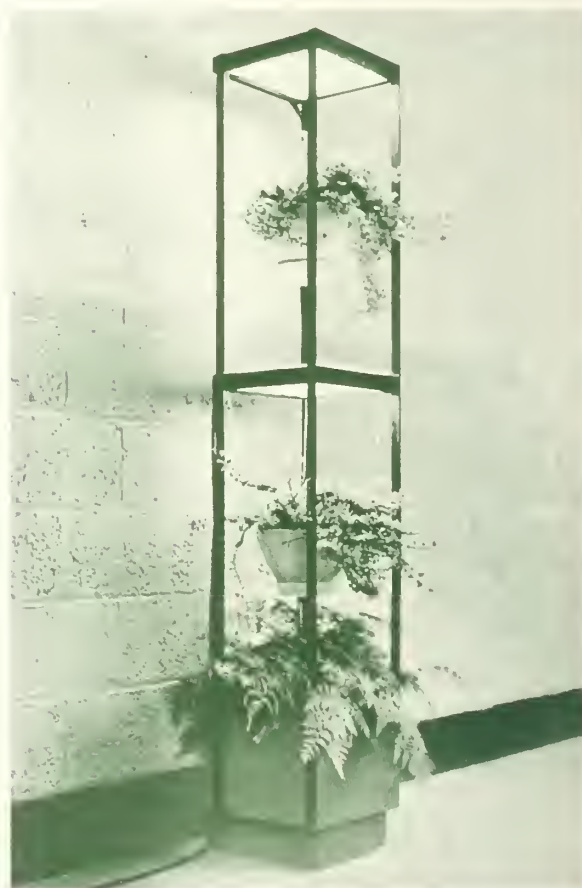
Anthurium hybrids  
Begonia rex  
Brameliads  
Cissus (Grape ivy)

Ficus (Rubber plant)  
Peperomia  
Philadendrons, other than oxycardium  
Schefflera  
Scindapsus  
Syngonium (Nephtythis)

#### High light (1000 foot candles)

Aloe  
African violet  
Begonias, other than rex  
Episcia  
Fatschedera  
Gloxinia  
Hedera  
Hoya carnasa  
Impatiens  
Marigold  
Petuna, cascade  
Salvia (Scarlet sage)

Some plants will not do well indoors. These plants are sunlovers, and though the lights in the indoor garden are bright, they still are pale and weak when compared with the sun. Among the sunlovers are zinnia, astor, cockscomb, morning-glory, nasturtium, snapdragon, and verbena, and most vegetable and food crops.



Indoor garden for displaying plants in hanging baskets (Plan B). The baskets are waterproof and have a drainage disk in the bottom.

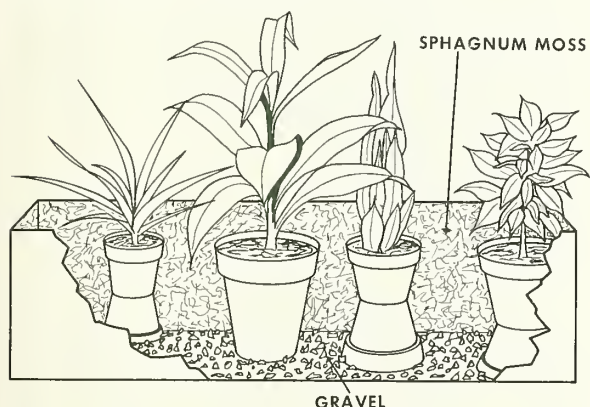


## Potting the Plants

All plants that go into the indoor garden should be in clay pots. Bagged potting soil, available in most garden shops and in many hardware stores and large grocery stores, is satisfactory to use for potting the plants. Or you can mix your own potting soil from equal parts of (a) garden soil; (b) sand or perlite; and (c) peat moss. Add one tablespoon of rock phosphate and one tablespoon of limestone to each gallon of soil mixture. Before using the soil, mix it thoroughly, adding water until the soil mixture is crumbly moist.

## Setting Plants in the Garden

Support large potted plants by setting them on other clay pots that are upended in the bottom of the planter box. Fill in around the upended pots with large gravel to a depth of 3 or 4 inches. Then fill the remainder of the planter box around the potted plants with unmilled sphagnum moss, pea-size gravel, or marble chips. Small potted plants can be plunged directly into the sphagnum or pea gravel.



**Pots in the planter box are raised to a uniform level. Space between them is filled with unmilled sphagnum moss.**

Though the panel fluorescent lamps used in the garden are not as hot as incandescent lamps, they generate enough heat to harm plants that come in direct contact with them. Therefore, keep all plants at least 4 inches away from the panel lamps.

## CARE OF THE INDOOR GARDEN

After you have selected plants that are adaptable to growing indoors, the degree to which you are successful in growing them depends primarily on the care you give them. You should water the plants thoroughly but infrequently, fertilize them periodically, and illuminate them adequately and regularly.

## Watering

Of all steps in the care of an indoor garden, watering is most important. If they don't get enough water, the plants dry out and die. If they get too much water, the plants drown or rot. The proper procedure is this: Water only often enough to prevent wilting—then water thoroughly.

As soon as you put plants in the garden, begin adjusting them to their new indoor environment. Water the soil ball, clay pot, and surrounding sphagnum moss to saturation. But don't flood it. Then allow the whole garden to dry until the plants are near wilting. You can detect wilting early by watching the leaves; they change from green to grey-green and begin to droop.

When the plants begin to wilt, water thoroughly again.

During the period of acclimation, some of the oldest leaves on the plants may yellow. If so, remove them. Wash the leaves with warm soapy water and stake the plants. They should now be ready for a long life in the indoor garden.

You can be sure of watering exactly the right amount if you use a plastic funnel. Use it this way:

- Insert the neck of the funnel into the soil in the pot.
- Fill the funnel with water. When it empties, fill it again.
- When water no longer drains from the funnel, stick your finger in the neck so the water won't spill, then remove the funnel.

Only the amount of water that the soil can hold will leave the funnel—never too much. Plants watered in this way will not need water again for several weeks. Flowering plants require more frequent watering than do foliage plants.

The wet moss on the surface of the planter tends to raise the relative humidity of the air around the plants as moisture evaporates from it. This high humidity is beneficial to the plants.

Don't bother syringing the plants to raise the humidity. Syringing seldom is effective; the humidity remains high only for a few minutes. And there is danger of spilling water on furnishings in the room.

When you are watering, avoid getting any water on the lamps, fixtures, and planter.

## Fertilizing

Every two to four weeks, water the plants in your garden with a solution of water-soluble fertilizer used at the concentration recommended on the label. Fertilize only when plants are actively growing.

Dry fertilizers seldom are successful for plants in an indoor garden. They may remain in the soil, undissolved, and may eventually kill the roots.

Even when you use soluble fertilizers, you may notice an accumulation of fertilizer on the surface of the soil; it will be a white crusty deposit. This deposit should be removed, along with a little of the surface soil, and replaced with new soil.



### Lighting

Plants that require only a low level of light can be illuminated for 12 hours a day. Plants that need a medium or high level of light must be lighted for 16 hours a day.

Use a timer to control the length of illumination. Don't depend on your memory to turn on the lights at the proper time. The timer can be set to turn the lights on and off at any time. You can set it and forget it.

For low-light plants, set the timer to turn on at 10 a.m. and off at 10 p.m. For medium-and high-light plants, set the timer to turn on at 6 a.m. and off at 10 p.m.

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### While You're Away . . .

Many houseplants die while the owner is away from home on a vacation or business trip. The best way to prevent loss of plants while you're away is to get a friend to look in on them now and then and give them any care they need.

If you can't get someone to do this, the next best way is to cover the planter with polyethylene sheet and reduce the lighting from 16 hours a day to 8 hours. If you have time before leaving, you can train the plants to get along with a little water. If not, just give them a good drink—using the funnel method—before you leave.

Plants usually can get along satisfactorily by themselves for about 2 weeks. If you must be away for more than 2 weeks, reconcile yourself to loss of some of your plants. Flowering plants in particular, are likely to die.

**Corridor or foyer garden (Plan C).** This version of the corridor garden is equipped with VHO fluorescent fixtures and lamps. The version illustrated on the cover is equipped with panel fluorescent lamps.

### Other Care

About once a week, turn each of the pots in the planter. This turning encourages symmetrical development of the plants and keeps the plants from rooting into the sphagnum moss through the drain hole of the pot.

If plants get old or sick or oversize, take them out of the planter and replace them with new, healthy, moderate-size plants.

You may find that you are having insect problems in your indoor garden. If so, follow the instructions in G 67, "Insects and Related Pests of House Plants," which is available from U.S. Department of Agriculture, Washington, D.C. 20250.

### OTHER USES

In addition to using your indoor garden for growing conventional house plants, you can use it for displaying plant collections—mosses, or ivies, or orchids, or bonzai. If you use the garden for displaying an orchid collection, surround it with a clear plastic-sheet material to hold in the high humidity needed by the orchids.

Or you might be more interested in using your indoor garden to display potted plants from the florist—plants that you intend to discard after their flowers pass. Because many of their needs are met by the garden, these potted plants last considerably longer there than they would on a table or window sill. Actually, the plants may continue to grow in the garden.

If you intend to use your garden exclusively for display of florist's plants, you might have a metal pan made to fit over the opening in the planter. The pan should be 3 or 4 inches deep, and should be painted to match the planter. Then fill the pan with pea gravel or marble chip and set the plants on the gravel-filled pan. When you water the plants, let some of the water drain into the pan; evaporation from the gravel or marble chip will increase the humidity in the air around the plants.

MORE INFORMATION

For more information on house plants and their care, see G 82, "Selecting and Growing House Plants," available from U.S. Department of Agriculture, Washington, D.C. 20250.

Your local library probably can supply you with books about growing plants indoors. Here are some references that you might ask for:

Cherry, E. C.

1965. fluorescent light gardening. 256 pp. D. Van Nostrand Co., Inc., Princeton, N. J.

Davidson, O. W.

1954. foot-candles and green leaves—new team mates in decoration. N.J. Agr. Expt. Sta. Cir. 558, 7 pp.

DeWerth, A. F.

1964. indoor landscaping with live foliage plants. Tex. Agr. Expt. Sta., Prog. Rpt. 10 (3): 3-6

Kranz, F. H., and Kranz, J. L.

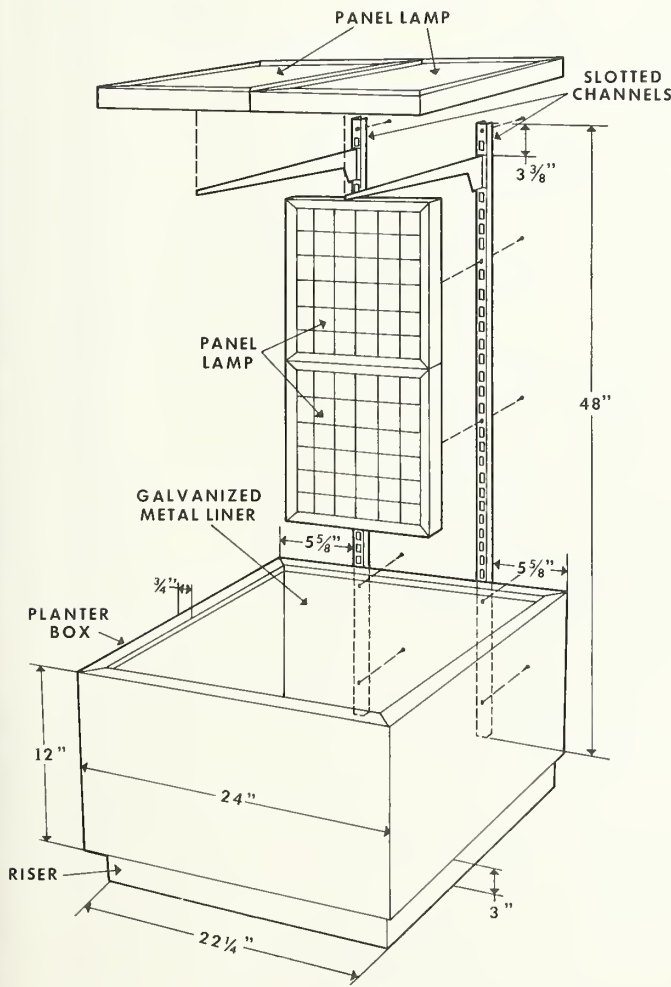
1957. gardening indoors under lights. 241 pp. The Viking Press, New York.

Schulz, Peggie.

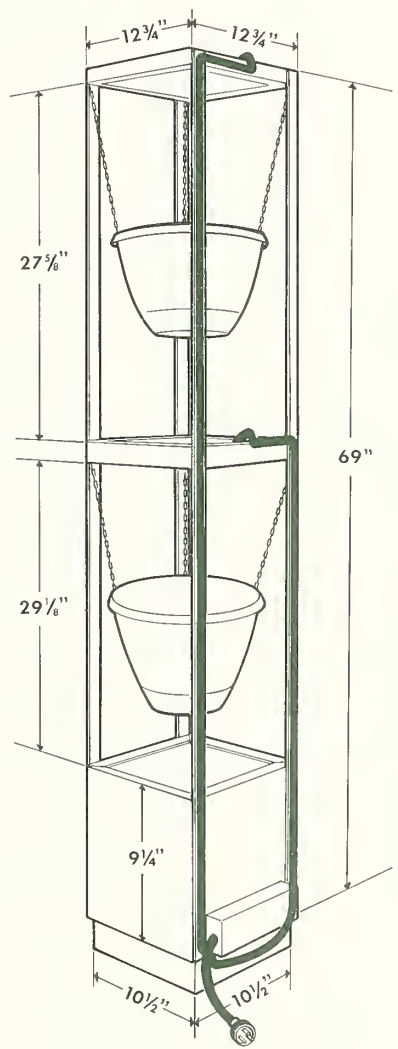
1955. growing plants under artificial light. 146 pp. M. Barrows & Company, Inc., New York

Waln, R. C.

1965. parlor gardening. (In press.) Livingston Publishing Co., Narberth, Pa.

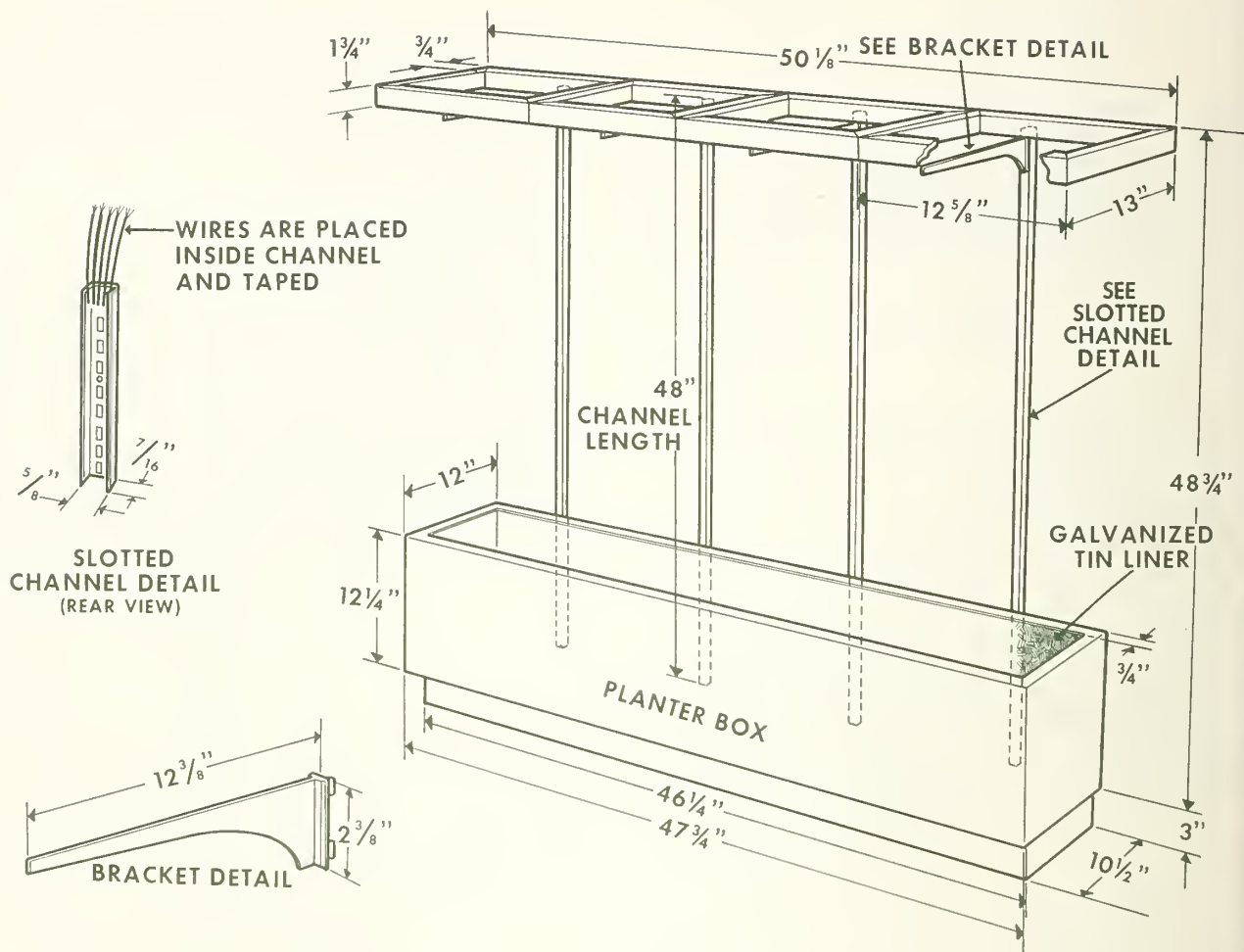


Plan A.—Focal-point garden 2 feet square.

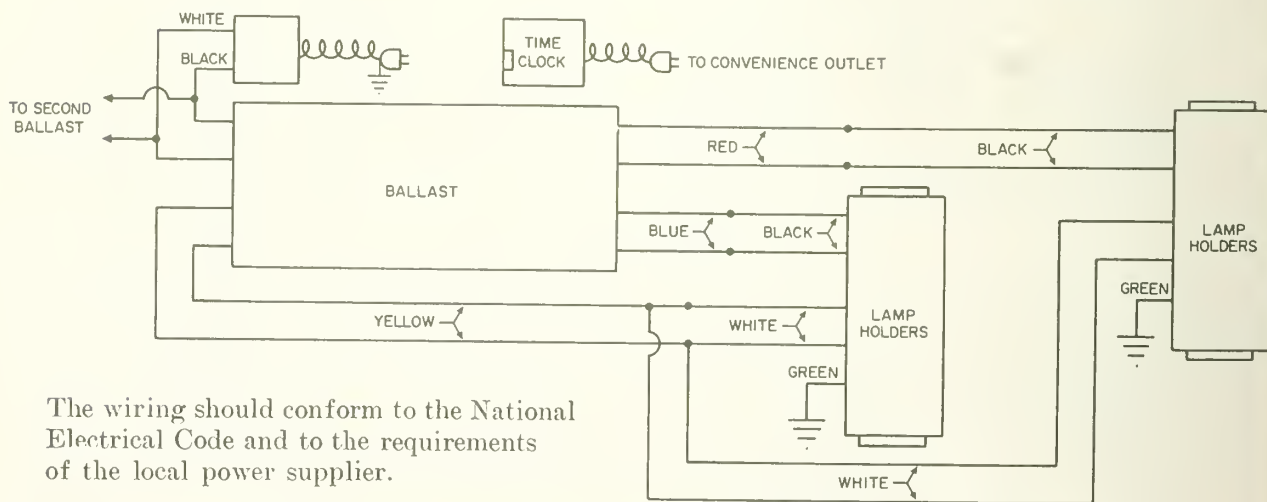


Plan B.—Indoor garden for hanging baskets.





Plan C.—Indoor garden for corridor or foyer.



The wiring should conform to the National Electrical Code and to the requirements of the local power supplier.

Wiring diagram for panel fluorescent lamps.

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